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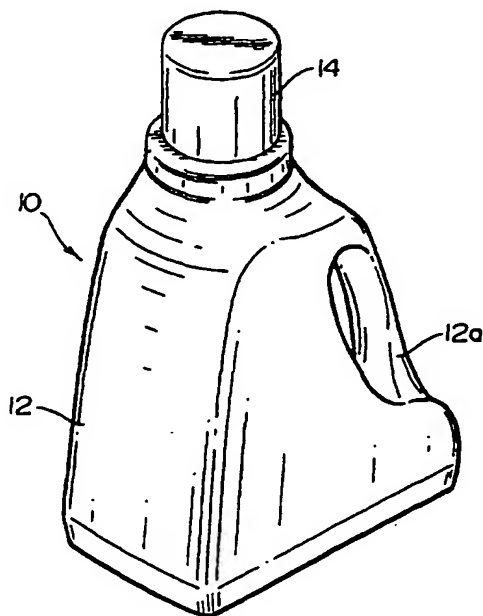
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[Continued on next page]

(54) Title: RECHARGEABLE DISPENSING DEVICE



(57) Abstract: The present invention is directed to a rechargeable dispenser including a cap removably connected to a bottle having an upwardly extending flange. The cap is provided with at least one reservoir to be compromised by the spout of the bottle to release chemical concentrate in the bottle for charging the rechargeable dispenser when mixed with a diluent such as water within the bottle.

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## RECHARGEABLE DISPENSING DEVICE

### *Field of the Invention*

The present invention is directed to a rechargeable dispensing device. More specifically, the present invention is directed to a rechargeable dispensing device for use  
5 with a capsule or cartridge containing a concentrate to be mixed with a diluent within the rechargeable dispensing device.

### *Background of the Invention*

In both the consumer and commercial markets for cleaning products, most products are premixed and "ready-to-use" to provide convenience for the end user.  
10 However, most of these products contain a substantial percentage of water in their formulations. Thus, a large volume of space is required for storing and marketing such products. Further there is significant cost involved in shipping and transporting large quantities of high water based chemical products.

In the area of laundry detergents, large bottles (e.g. one gallon) containing liquid  
15 laundry detergent are readily sold to the consumer market today. In recent years, there has been a trend to more highly concentrated liquid laundry detergent to reduce the size of the container providing the same amount of product that was previously marketed in larger bottles with regards to active ingredients. However, even in these more

*Summary of the Invention*

An object of the present invention is to provide an improved rechargeable dispensing device.

5 A second object of the present invention is to provide a rechargeable dispensing device for use with a capsule or cartridge containing a concentrated product to be diluted within the rechargeable dispensing device with a diluent.

A third object of the present invention is to provide a rechargeable dispensing device including a container and closure, the closure configured for containing a concentrate.

10 A fourth object of the present invention is to provide a rechargeable dispensing device including a container and closure, the closure configured to contain concentrate and open when connected to the container.

15 A fifth object of the present invention is to provide a rechargeable dispensing device including a container and closure, the closure configured for containing a concentrate and storing the concentrate when the closure is connected to the container, and including a mechanism for subsequently opening the closure to release the chemical concentrate into the container.



*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

A sixth object of the present invention is to provide a rechargeable dispensing device including a container and closure, the closure being provided with multiple chambers which can be selectively opened to allow for recharging of the container a multiple number of times.

5 A seventh object of the present invention is to provide a rechargeable dispensing apparatus which does away with the need for detergent bottles.

An eighth object of the present invention is to provide a rechargeable dispensing apparatus including a detergent tank in fluid communication with a wash bin of a washing machine and configured to selectively release detergent into said wash bin, and, a cartridge  
10 containing a chemically concentrated detergent and configured to be releasably received by the detergent tank for dilution of the chemically concentrated detergent in the detergent tank.

A ninth object of the present invention is to provide a rechargeable dispensing apparatus which allows for at least one pre-measured amount of at least one chemical to  
15 be introduced directly to the wash bin of a washing machine.

A tenth object of the present invention is to provide a rechargeable dispensing apparatus including a cage in fluid communication with a wash bin of a washing machine and a cartridge including at least one chemical reservoir and configured to be releasably

received by the cage for introduction of the chemical to the wash bin of the washing machine.

5 The present invention is directed to a rechargeable dispenser including a bottle and a removably connected cap. The opening of the bottle is provided with a spout to facilitate pouring of the chemical product from the bottle. The spout extends upwardly from the opening of the bottle, and is protected by the cap when the cap is assembled onto the bottle. The rechargeable dispenser according to the present invention includes a reservoir for containing chemical concentrate or containing chemical concentrate associated with the rechargeable dispenser. Specifically, the reservoir can be a separate stand alone item sold separately from the rechargeable dispenser, however, the reservoir is configured to connect with the rechargeable dispenser in some manner. The reservoir may be packaged with the rechargeable dispenser, may be connected on the outside of the rechargeable dispenser (e.g. tied, glued, mechanically fastened), and/or can be provided within the rechargeable dispenser. The reservoir is preferably provided within the rechargeable dispenser, for example, within the cap and/or bottle. A preferred embodiment provides one or more reservoirs in the cap. More preferably, the cap is configured in such a manner that the one or more reservoirs can be compromised by the spout of the bottle.

10

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20 A preferred system includes providing a cap with a removable cartridge having at least one reservoir. The cartridge is configured to fit within the cap, and is preferably removable so that the cartridge can be replaced within the cap while allowing the cap to

be reused many times. Preferably, the cartridge is rotatable within the cap to allow the use of a multiple chamber cartridge with a stationary spout. In this manner, the cartridge can rotate while the cap is being tightened or loosened on the bottle.

5 A preferred method of marketing the rechargeable dispenser would be to shrinkwrap or blister pack caps containing chemical concentrate for use with the rechargeable dispenser according to the present invention. A purchaser would go to the store and purchase a cap instead of, for example, a one gallon ready-to-use conventional dispenser to take home or to a business for use. The presentation thereby greatly increases the amount of product which may be stocked on the retail or commercial shelf  
10 due to the high concentration of the chemical concentrate and elimination of unneeded diluent such as water. Further, the amount of space and carrying weight are greatly reduced for transporting a cap home or to a business versus the conventional ready-to-use product dispenser. Further, at the home or business, shelf space needed to store chemical products is greatly reduced again due to the high level of chemical concentration within  
15 the caps.

#### ***Brief Description of the Drawings***

Figure 1 is a perspective view of a rechargeable dispenser according to the present invention.

Figure 2 is a side elevational view of the rechargeable dispenser shown in Figure

1.

Figure 3 is an end elevational view of the rechargeable dispenser shown in Figures

1 and 2.

Figure 4 is a vertical center side cross-sectional view of the rechargeable dispenser  
as indicated in Figure 3.

Figure 5 is a vertical transverse cross-sectional view of the rechargeable dispenser  
as indicated in Figure 2.

Figure 6 is a partial broken away detailed perspective view of a bottle opening and  
spout of the rechargeable dispenser according to the present invention.

Figure 7 is a detailed perspective view of the bottle opening and spout shown in  
Figure 6 unassembled from the mouth of the bottle.

Figure 8 is a vertical center cross-sectional view of another embodiment of a bottle  
opening and spout of the rechargeable dispenser according to the present invention shown  
unassembled from the neck of the bottle.

Figure 9 is a perspective view of the bottle opening and spout shown in Figure 8.



Figure 10 is a perspective view of a cap for use with the rechargeable dispenser according to the present invention.

Figure 11 is a vertical center cross-sectional view of the cap shown in Figure 10.

Figure 12 is a perspective view of another embodiment of a cap for use with the rechargeable dispenser according to the present invention.

Figure 13 is a vertical center cross-sectional view of the cap shown in Figure 12.

Figure 14 is a perspective view of a further embodiment of a cap for use with the rechargeable dispenser according to the present invention.

Figure 15 is a vertical center cross-sectional view of the cap shown in Figure 14.

Figure 16 is a vertical center cross-sectional view of an even further embodiment of the cap for use with the rechargeable dispenser according to the present invention.

Figure 17 shows a perspective view of a cap for use with the rechargeable dispenser according to the present invention provided with a removable cartridge.

Figure 18 is a vertical center cross-sectional view of the cap and cartridge system shown in Figure 17.

Fig. 26 shows a bottom view of the cartridge used in the cage portion of the rechargeable dispensing apparatus shown in Figs. 24 and 25.

### *Detailed Description of Preferred Embodiments*

5 A rechargeable dispenser according to the present invention is shown in Figures 1-3. This particular embodiment of the rechargeable dispenser according to the present invention is particularly suitable for laundry detergents, fabric softeners, and other home care or professional care products.

10 The rechargeable dispenser 10 includes a bottle 12 and a cap 14. The bottle 12, for example, may be blow molded from polyethylene, polypropylene, polyvinyl chloride, PETE, or other suitable plastic material. The cap 14 for example, may be injection molded from the same or similar material as the bottle 12. The bottle 12 is molded with a handle 12a to allow a person to easily carry, move, and pour the bottle.

15 As shown in Figures 4 and 5, the bottle 12 is provided with a separate neck opening 16 including a spout 18. The neck opening 16 fits into an open end 12b of the bottle 12. The neck opening 16 including spout 18 is shown as being one-piece construction, however, the neck opening 16 and spout 18 can be separate pieces assembled together.

The cap 14 is provided with external threads 14a cooperating with internal threads 16a of the neck opening insert 16. In the embodiment shown in Figures 4 and 5, the neck opening insert 16 is connected within the neck opening 12b of the bottle 12. The neck opening insert 16 is fixed to prevent rotation thereof within the neck opening 12b of the bottle 12. Thus, in this embodiment the spout 18 is also fixed from rotation relative to the bottle 12. Alternatively, the spout 18 can be configured to be a separate piece from the neck opening insert 16 to allow the spout 18 to freely rotate relative to the neck opening insert and bottle 12. In this alternative embodiment, the spout 18 can be moved into different positions for selectively opening one of a plurality of reservoirs to be provided in a cap. For example, viewing Figure 5, the circular flange 18a of the spout 18 can be received within a circular channel provided at the base of the neck opening insert 16 to allow the spout 18 to move relative to the neck opening insert 16. In this alternative embodiment, the circular flange 18a may be oriented substantially horizontally to allow the circular flange to rotate within an inner channel provided in the base of the neck opening insert 16.

Another embodiment of a neck opening insert 16' including a modified spout 18' is shown in Figures 6 and 7. In this embodiment, the spout 18' is provided with teeth 18a' to facilitate opening a reservoir in the cap to be explained hereinbelow.

A further embodiment of the neck opening insert 16" is shown in Figures 8 and 9. In this embodiment, the spout 18" is provided with a sharpened cutting edge 18a" to facilitate opening of the reservoir in the cap to be discussed hereinbelow.

The details of the cap 14 are shown in Figures 10 and 11. The cap 14 is provided with external threads 14a and a sealing flange 14b. The bottom of the cap is provided with a sealing membrane 14c defining a reservoir 15' containing concentrated chemical 20. The sealing membrane 14c can be metal foil, plastic sheet, composite or other suitable sealing membranes to hermetically seal the reservoir 15. The sealing membrane 14c must be designed to withstand the various chemical compounds to be stored within the reservoir 15 to provide a satisfactory shelf life. An alternative embodiment of the cap 14' as shown in Figures 12 and 13. In this embodiment, the membrane 14c' is sealed around the perimeter at a position above the lower edge of the cap 14. This embodiment allows a cap to be partially placed over the spout 18 prior to being opened by the spout 18 upon connecting the cap 14' to the bottle 12. In further embodiments, the membrane 14c' can be located even higher so that the external threads 14a' have already engaged with the internal threads of the neck opening insert 16 prior to comprising the sealing membrane 14c. In this manner, it is difficult or impossible to spill any of the chemical concentrate on the outside of the rechargeable dispenser. A multiple reservoir cap 14" is shown in Figures 14 and 15. In this embodiment, the cap 14 is provided with a partition wall 22 defining two separate reservoirs 15a and 15b. The two reservoirs 15a and 15b are hermetically sealed by the sealing membrane 14c". The reservoirs 15a and 15b may contain separate charges of the same chemical concentrate, or alternatively, two different components of a multi-component chemical system to be mixed with a diluent such as water within the bottle 12. When using this particular cap 14", it is preferred that the spout 18 is configured to rotate within the neck of the bottle 12 so that the spout can be selectively utilized for compromising one reservoir at a time to provide multiple

24. The apparatus according to claim 21, including a spout extending upwardly for an opening of said bottle, said spout configured to open said reservoir.

25. The apparatus according to claim 22, wherein said reservoir is provided within said bottle.

5 26. The apparatus according to claim 21, wherein said concentrated laundry detergent is formulated to increase the viscosity of diluent when mixed together within the laundry detergent mixing apparatus.

27. The apparatus according to claim 26, wherein said concentrated laundry detergent contains Acusol.

10 28. The apparatus according to claim 27, wherein said concentrated laundry detergent contains Acusol stabilized by 2butoxyethanol or isopropanol.

A rechargeable dispensing apparatus, comprising:

a detergent tank in fluid communication with a wash bin of a washing machine and configured to selectively release detergent into said wash bin; and,

recharging of the rechargeable dispenser. Alternatively, the spout can be provided with a slit down the center thereof so that the spout can compromise both reservoirs simultaneously for a multi-component chemical system. The sealing membrane 14c" seals around the entire lower perimeter of the cap 14" and with the bottom edge of the partition wall 22 to hermetically seal both reservoirs 15a and 15b. In a further embodiment shown in Figures 16, an inner flange 14d is provided to seal with the sealing membrane 14c"" so that the sealing membrane 14c"" is flush with the lower edges of the cap 14"". This embodiment would tend to prevent inadvertent rupturing or damage to the lower sealing membrane 14c"".

The cap can be provided with a single reservoir or multiple separate reservoirs. The reservoirs can be positioned side-by-side and/or stacked one on top of each other to provide selective opening of the reservoirs and/or multiple opening of different reservoirs. One and two chamber reservoirs are shown in the embodiments, however, three, four, five, six, seven, eight, nine, ten or more reservoirs could potentially be provided in either a side-by-side and/or stacked arrangement within the cap. These multiple reservoir embodiments of the cap can provide a multiple number of times for recharging the rechargeable dispenser and/or multiple recharging with plural separate components.

The chemical concentrate to be stored within the one or more reservoirs can cover a wide range including household cleaners, commercial cleaners, glass cleaners, all-purpose cleaners, detergents, laundry detergent, dishwasher detergent, fabric softener, fabric protectant, carpet cleaner, fragrance, sanitizer, deodorizer, disinfectant, shower

cleaning chemical (e.g. Clean Shower), oils, waxes, floor cleaning products, floor care chemicals, fungicides, insecticides, mildew treatments, and other types of chemical products.

5 The cap 14 shown in Figure 10 defines the chemical reservoir 15. Alternatively, a separate cartridge 24 can be inserted within the cap 14, as shown in the embodiment of Figures 17 and 18. The cartridge 24 is preferably removably inserted within the cap 14 so that the cartridge 24 can be replaced after each use while reusing the cap 14. The cartridge 24 is provided with an outwardly extending lower flange 24a which abuts the lower edge of the cap 14 shown in Figure 18 when the cartridge 24 is fully inserted within the cap 14. The cartridge 24 can be fixedly held within the cap 14 so as to not rotate relative thereto, or alternatively, the cartridge 24 can be rotated relative to the cap 14 when the cartridge 24 is fully inserted within the cap 14. This feature is important when the cap 14 is provided with multiple reservoirs so that the spout 18 does not need to rotate relative to the bottle 12, but instead the cartridge 24 can freely rotate within the cap 14 when twisting the cap 14 onto the bottle 12. A further embodiment using a cartridge system is shown in Figures 19 and 20. In this embodiment, a shorter length cartridge 24' is provided within the cap 14'. The cap 14' is provided with an inner flange 14c' to engage with the outwardly extending flange 24a' of the cartridge 14', shown in Figure 20.

10

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*Chemical Products*

In order to practically implement the rechargeable dispenser according to the present invention, it is important that the resulting ready-to-use mixed product is at least as effective and similar in consistency with conventional ready-to-use products sold today.

5 In order to provide a ready-to-use product having a similar consistency with conventional ready-to-use products premixed at the factory, it was decided that a thickening process would need to be implemented when mixing the concentrated chemical with a diluent such as water within the rechargeable dispenser according to the present invention. In general, to make a solution more viscous one either adds a very thick syrup which is diluted or a  
10 two-part solution which thickens when mixed. In the present invention, a free flowing one-shot is utilized that is even less viscous than the diluted solution. The one-shot is stable as a one-part solution.

In the present invention, Acusol 820 (Rohm-Haas) is stabilized by 2butoxyethanol or isopropanol. If Acusol is added to water the solution thickens. However, if the Acusol  
15 is first mixed with one of the alcohols it is stable in the presence of water. This discovery allows one to use a one-part instead of a two-part system (such as encapsulation of the Acusol).

A 100g one shot solution was prepared, which was diluted in a standard 100ounce TIDE (PROCTOR AND GAMBLE) bottle. The conventional cap on the existing type



bottle is large enough to hold about 200 grams, which is capable of providing two separate charges of chemical concentrated product.

*Example 1*

5	Part A -	55g	625 FE (Henkel-Polyglycoside-nonionic surfactant as detergent)
		5.5g	SXS (Stepan-Sodium Xylene Sulfonate-Hydrotrope solubilizer)
		35g	Ninol 40-CO (Stepan-Coco Diethanolamide-nonionic surfactant)
		10g	Salts (Anti-corrosive solution of 72g Water, 7g EDTA, 29g Sodium Metasilicate)
		5g	Standapol A (Ammonium Lauryl Sulfate-anionic surfactant)
		5g	Ammonium Hydroxide (28% solution to adjust PH - Acusol thickens in final solution as a function of PH)
10	Part B -	4.5g	Acusol 820 (acrylic polymer thickener)
		6g	2Butoxyethanol
15	Part C -	Ammonium Hydroxide 28% Solution	
	Part D -	0.6g	Violet Dye (Pylam Products)
		0.4g	Cherry Red Dye (Pylam Products)

One Shot Solution - 37g A, 57 B, 8g C, 6g D

25g of one shot solution was added to 750ml of water. The resulting liquid laundry detergent appeared to clean oily stains better than TIDE. However, TIDE cleaned soil stains better than this one shot.

5 We have been able to improve this formula by significantly reducing the amount of Acusol (Part B), and converting the weight saving entirely to cleaning surfactants while maintaining a viscous solution.

*Example 2*

Part A - 15g 1625FE  
10 8.5g SXS

One Shot Solution - 37g A, 47g A2, 10g B, 8g C, 6g D

25g of one shot solution was added to 750ml of water. The resulting liquid laundry detergent appeared to clean oily and soil stains better than TIDE. TIDE had a slightly whiter background.

15 *Example 3*

Part E - Optical brightener (Ciba Geigy)

configured to automatically charge tank, A, with water up  
tube 118.

5 A further alternative embodiment of a rechargeable  
shown in Figs. 23-26. Preferably, rechargeable dispensing  
portion 128 which is mounted to an agitator 130 within  
machine 116. Cage portion 128 is therefore in fluid comm  
washing machine 116. As shown in Fig. 24 cage portion 1  
alternative embodiment of a cartridge 132 according to the  
cartridge 132 includes at least one chemical reservoir. In ti  
10 24-26, cartridge 132 includes a first reservoir 134 conta  
reservoir 136 including a secondary chemical such as a rin  
It is important to note that cartridge 132 includes a flange 1  
allows cartridge to be loaded into cage portion 128 in onl  
Figs. 24-25. As shown in Figs. 24-26, reservoir 134 is con  
15 a piercing element 138 included in a floor 141 of cage portion

Reservoir 136 is specifically configured to compromise  
generated by agitator 142 during a spin cycle of washing ma  
150 is covered by a foil 152 which tears under signific  
allowing the secondary chemical within reservoir 136 to t  
20 floor 141 of cage portion 128. It is important to note th

angled outwardly to ensure that the force vector associated with spinning agitator 130 acts significantly upon foil 152.

*What is Claimed is:*

1. A rechargeable dispensing apparatus, comprising:

a bottle provided with an opening;

a cap removably connected to said bottle;

5 a spout connected to said bottle, said spout extending outwardly from said opening  
of said bottle; and

at least one reservoir for containing concentrate, said reservoir configured for  
connecting with the rechargeable dispensing apparatus.

10 2. The apparatus according to claim 1, wherein said at least one reservoir is provided  
within said cap.

3. The apparatus according to claim 1, wherein said cap is provided with multiple  
reservoirs.

4. The apparatus according to claim 1, wherein said reservoir is provided within a  
cartridge, said cartridge configured to connect with the rechargeable dispensing apparatus.

5. The apparatus according to claim 2, wherein said reservoir is provided with a cartridge, said cartridge configured to connect with said cap.

6. The apparatus according to claim 5, wherein said cartridge is removably connected to said cap.

5 7. The apparatus according to claim 4, wherein said cartridge is configured with multiple reservoirs to allow selective opening of each reservoir to allow multiple recharging of the rechargeable dispensing apparatus.

8. The apparatus according to claim 4, wherein said cartridge is configured with multiple reservoirs to allow selective opening of plural reservoirs to allow mixing of  
10 multiple components within said rechargeable dispensing apparatus.

9. The apparatus according to claim 5, wherein said cartridge is configured with multiple reservoirs to allow selective opening of each reservoir to allow multiple recharging of the rechargeable dispensing apparatus.

10. The apparatus according to claim 5, wherein said cartridge is configured with  
15 multiple reservoirs to allow selective opening of plural reservoirs to allow mixing of multiple components within said rechargeable dispensing apparatus.

11. The apparatus according to claim 7, wherein said spout is configured to rotate within said opening of said bottle.

12. The apparatus according to claim 9, wherein said spout is configured to rotate within said opening of said bottle.

5 13. The apparatus according to claim 1, wherein said spout is configured to open said reservoir.

14. The apparatus according to claim 2, wherein said spout is configured to open said reservoir in said cap.

10 15. The apparatus according to claim 4, wherein said spout is configured to open said cartridge.

16. The apparatus according to claim 1, wherein said spout is provided by a bottle opening insert including a spout, said bottle opening insert configured to connect with said opening of said bottle.

15 17. The apparatus according to claim 1, said spout configured for opening said reservoir.

18. The apparatus according to claim 2, said spout configured for opening said reservoir when said cap is being connected to said bottle.

19. The apparatus according to claim 17, wherein said spout is provided with teeth for opening said reservoir.

5 20. The apparatus according to claim 17, wherein said spout is provided with a sharpened surface for opening said reservoir.

21. A laundry detergent dispensing apparatus, comprising:

a bottle;

a cap removably connected to said bottle;

10 a reservoir containing concentrated laundry detergent configured to connect to the laundry detergent dispensing apparatus.

22. The apparatus according to claim 21, wherein said reservoir is provided within the laundry detergent apparatus.

15 23. The apparatus according to claim 22, wherein said reservoir is provided within said cap.



a cartridge containing a chemically concentrated detergent and configured to be releasably received by said detergent tank for dilution of said chemically concentrated detergent in said detergent tank.

29. A rechargeable dispensing apparatus, comprising:

5 a cage in fluid communication with a wash bin of a washing machine; and

a cartridge including at least one chemical reservoir and configured to be releasably received by said cage for introduction of said chemical to a wash bin of said washing machine.

30. A rechargeable dispensing apparatus according to claim 30, wherein

10 said cartridge includes a first reservoir containing a detergent.

31. A rechargeable dispensing apparatus according to claim 31, wherein

said first reservoir is compromised upon receipt by said cage.

32. A rechargeable dispensing apparatus according to claim 31, wherein

said cartridge includes a second reservoir containing a secondary chemical.

33. A rechargeable dispensing apparatus according to claim 33, wherein

said cage is mounted to an agitator within said wash bin.

34. A rechargeable dispensing apparatus according to claim 34, wherein

said second reservoir is compromised by centrifugal force.

5 35. A rechargeable dispensing apparatus according to claim 35, wherein

said second reservoir contains a rinsing agent.

36. A rechargeable dispensing apparatus according to claim 35, wherein

said second reservoir contains a fabric softener.

FIG. 1

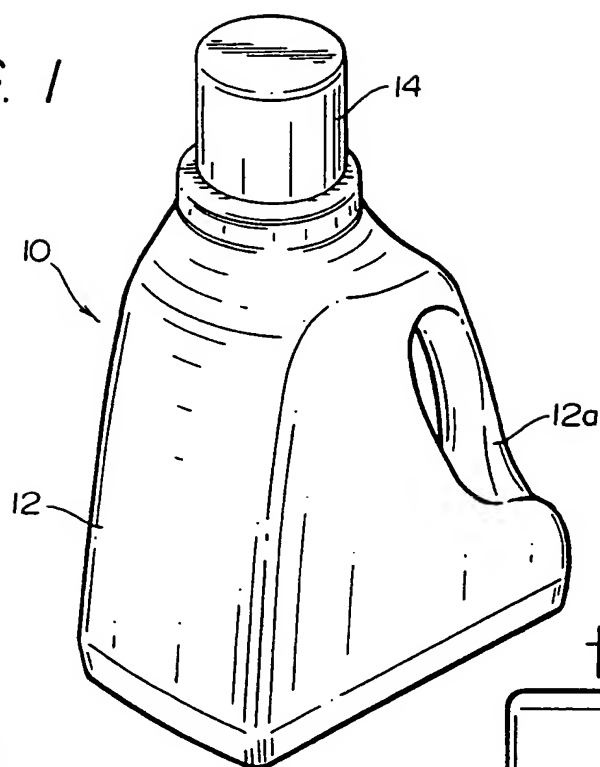


FIG. 2

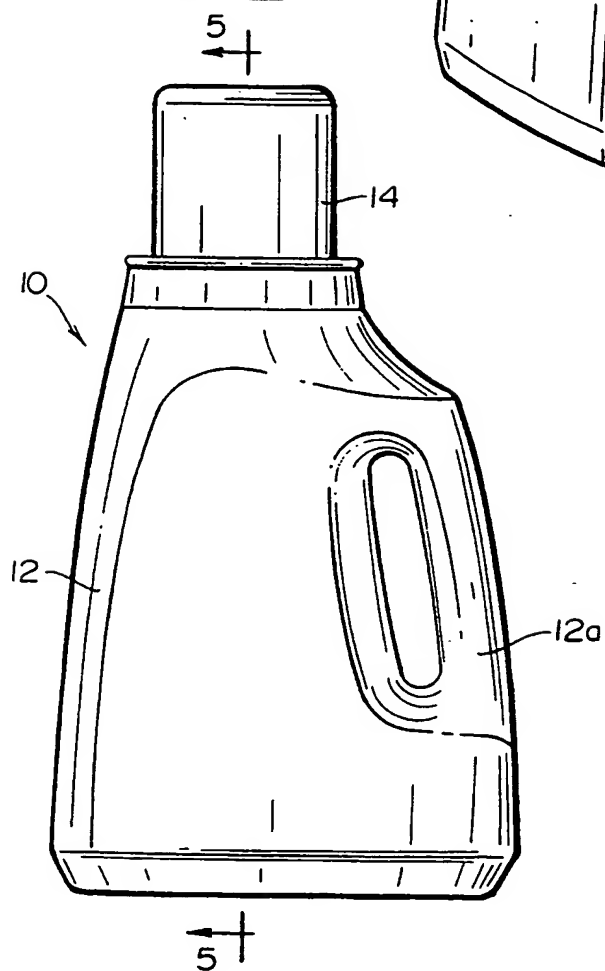
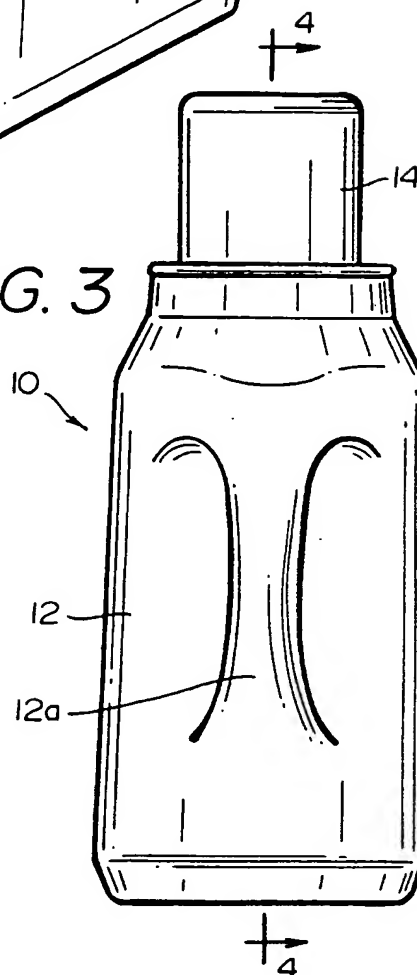
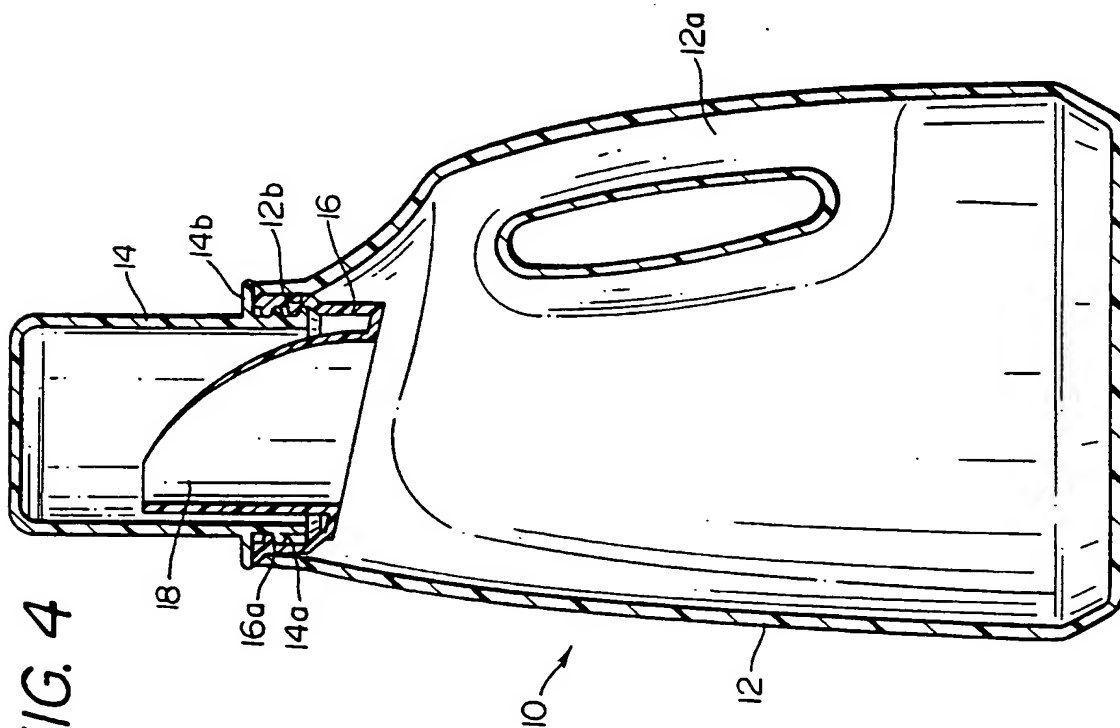
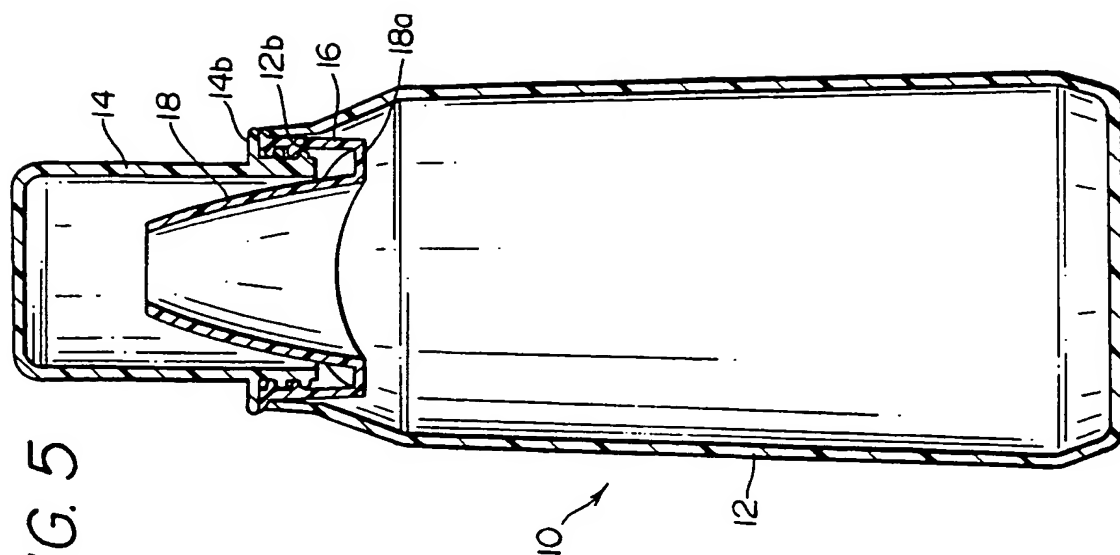


FIG. 3





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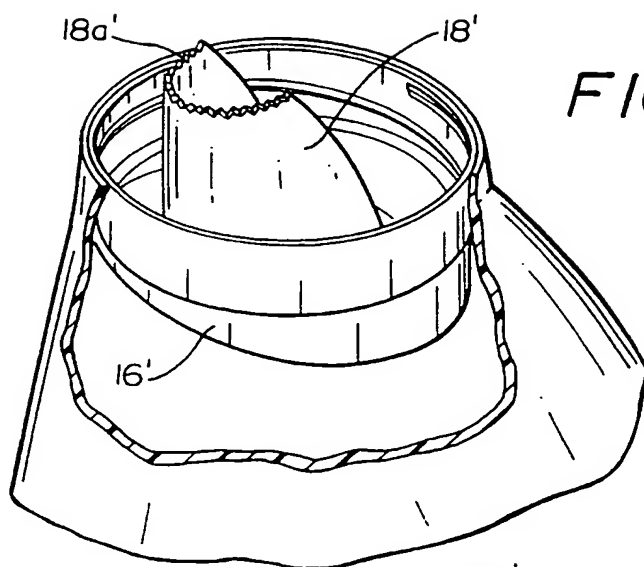


FIG. 6

FIG. 7

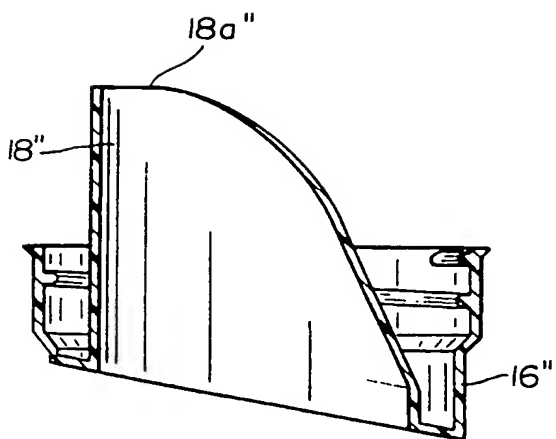
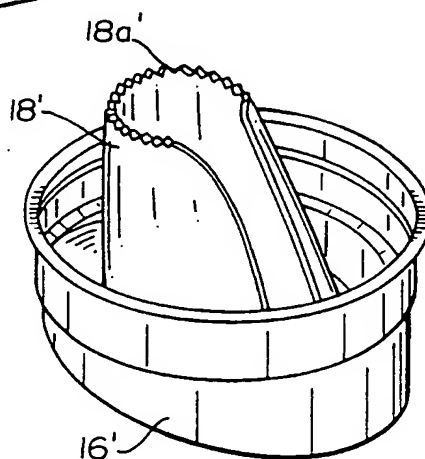


FIG. 8

FIG. 9

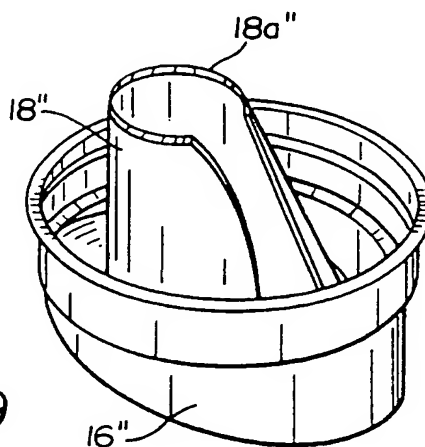


FIG. 10

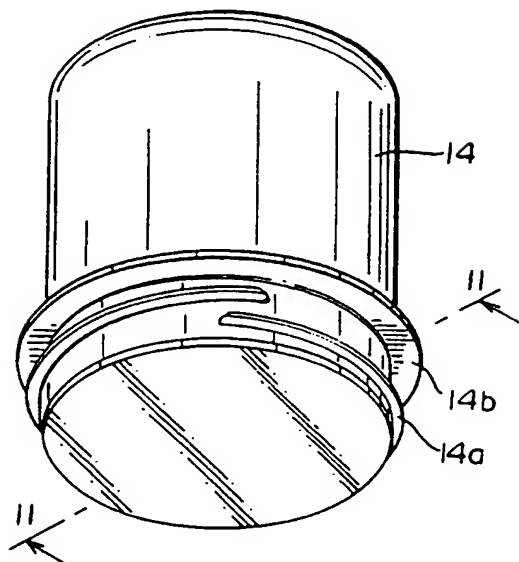


FIG. 12

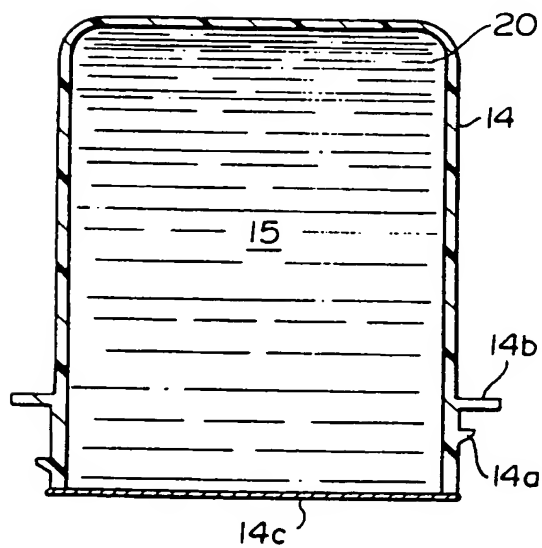
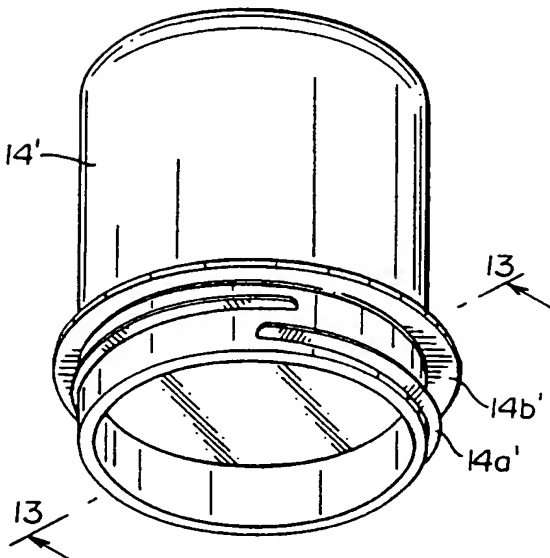


FIG. 11

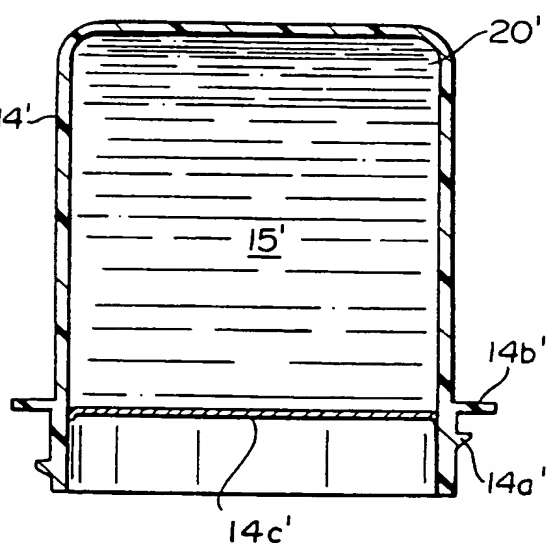


FIG. 13

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FIG. 16

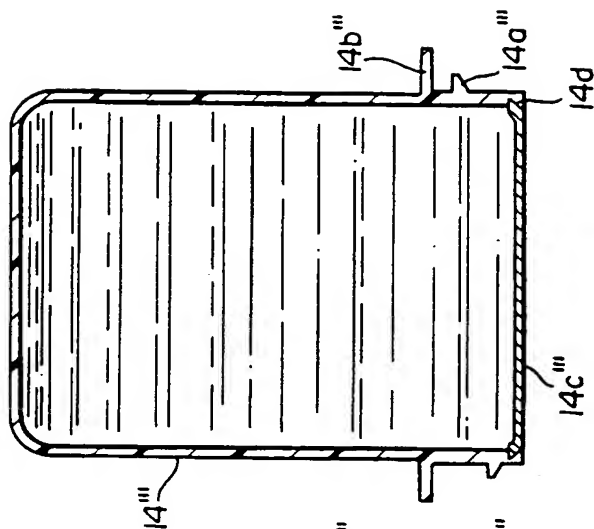


FIG. 15

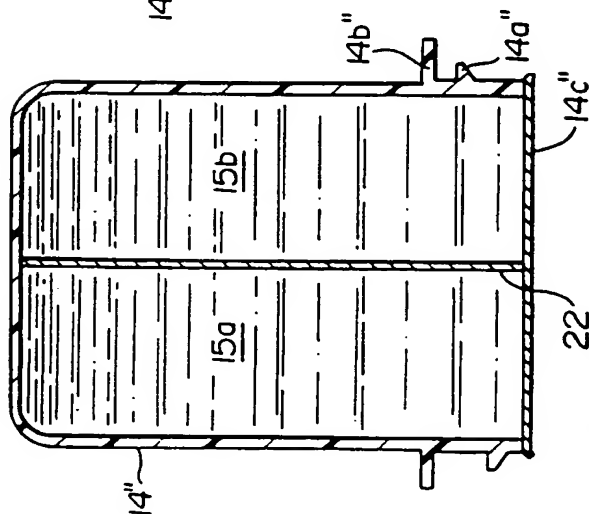


FIG. 14

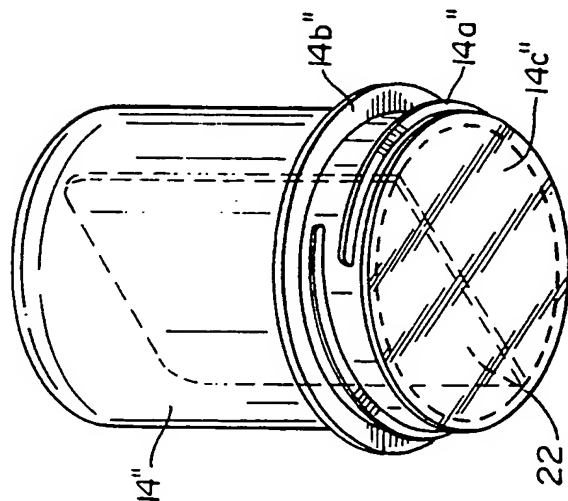


FIG. 17

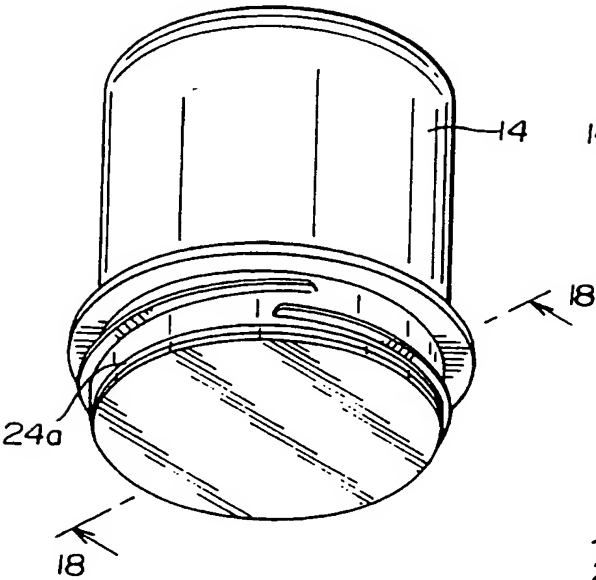


FIG. 19

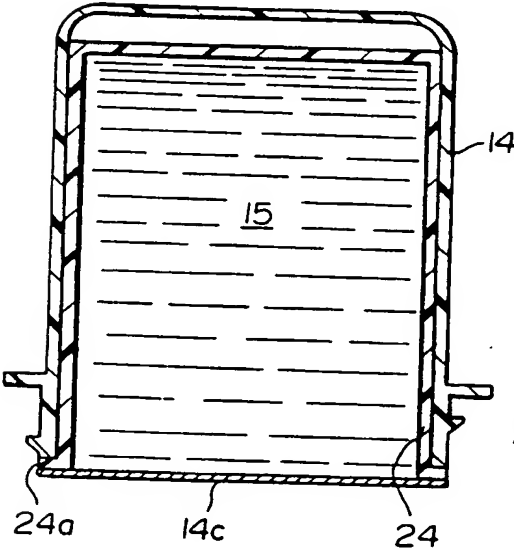
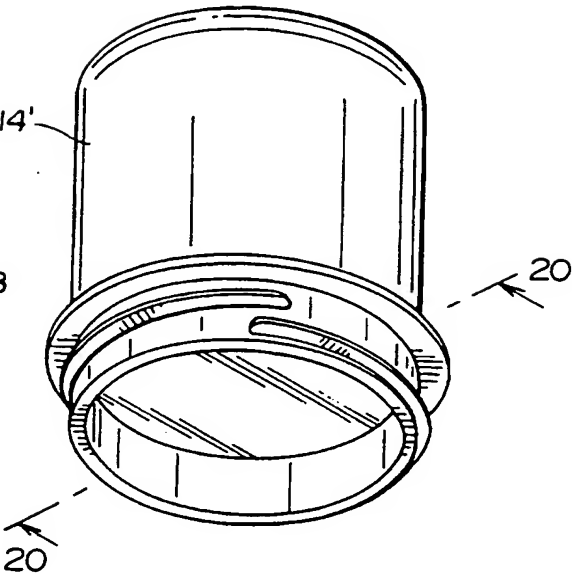


FIG. 18

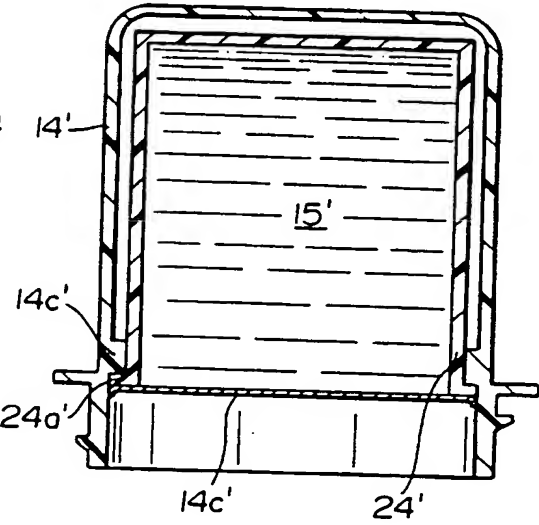
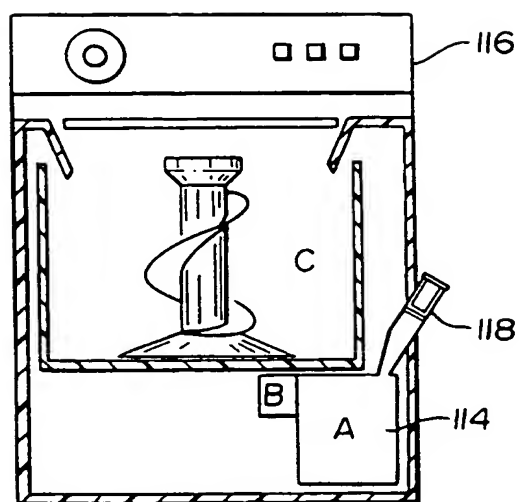
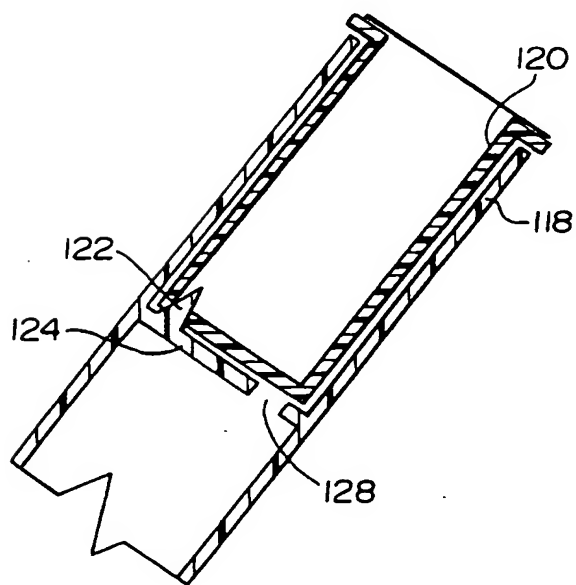


FIG. 20



*FIG. 21**FIG. 22*

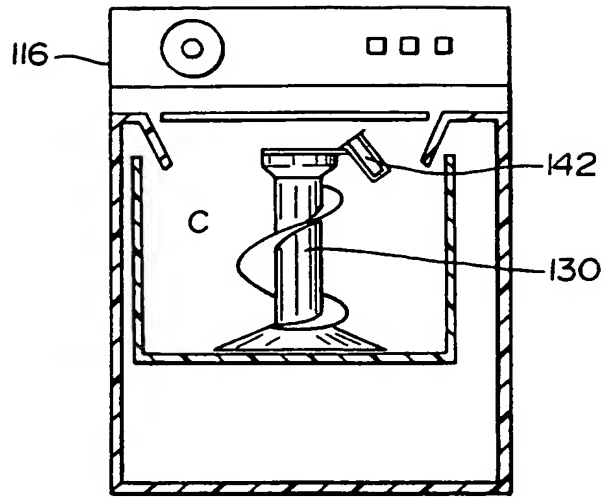


FIG. 23

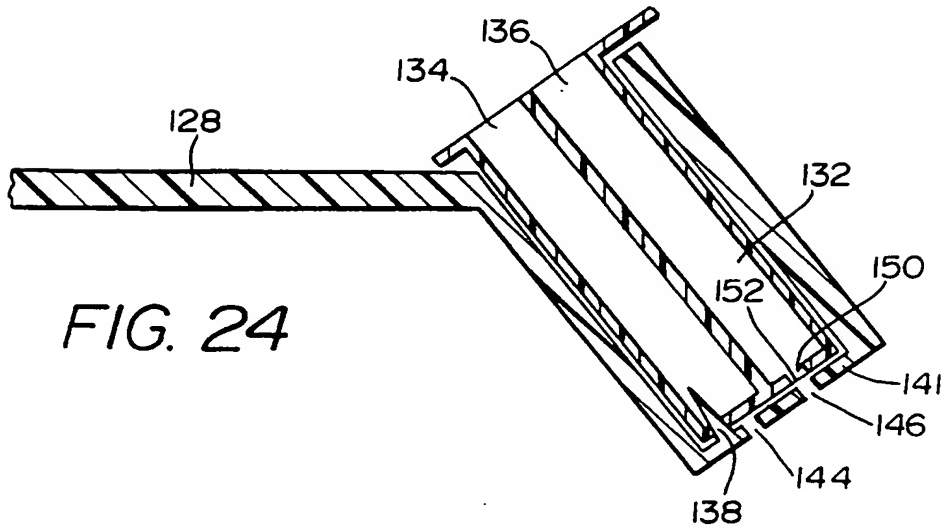


FIG. 24

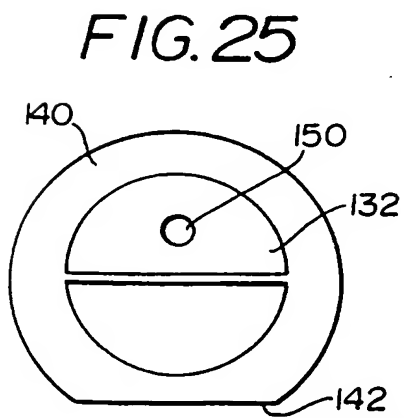


FIG. 25

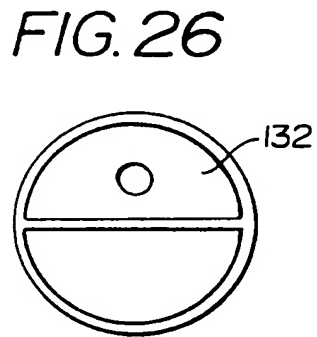


FIG. 26